A New Method for Correcting ScanSAR Scalloping Using Forests and inter SCAN Banding Employing Dynamic Filtering

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Abstract Scanning Synthetic Aperture Radar (ScanSAR) is very useful for Earth observation because of its wider imaging swath and shorter revisit time. However, ScanSAR is sometimes affected by the following three artifacts: 1) Scalloping, which often appears as repeating weak azimuth stripes at both edges of the focused burst image; 2) Azimuth ambiguity, (i.e., a form of ghosting that appears over the adjacent uniform area when the pulse repetition frequency (PRF) is below the Doppler bandwidth); and 3) Radiometric discontinuity (i.e., banding) between two adjacent scans. This paper proposes three methods to correct these artifacts. Specifically, the proposal for scalloping correction using Amazon Rainforest data, and the correction for the inter SCAN banding using the dynamic gain correction algorithm. Several corrected sample data sets of the Phased-Array L-band Synthetic Aperture Radar (PALSAR) on board the Advanced Land-Observing Satellite (ALOS) are presented to demonstrate the validity of the proposed methods.

Keywords: PALSAR, ALOS, Signal truncation, Banding, Scalloping, ScanSAR, Amazon data